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Being a Long Distance Out-Commuter or Home Employee in a Rather Peripheral Region? Evidence of a German Federal State

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Being a long distance out-commuter or home employee in a rather peripheral region? Evidence of a German federal state

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Abstract

After reunification, a net outmigration from East German regions occurred until the late 1990th. Younger people were looking for jobs in the west and took the opportunity to leave East Germany or started to out-commute. Today, 30 years later, outmigration flows still exist but net migration is almost zero. For the Federal State Mecklenburg-Vorpommern (MV), which is the focus of this paper, we show that about 76,000 individuals out-commute for work-related reasons in another German federal state. At the same time, however, employers in MV are complaining about labour shortages. In this paper, we distinguish out-commuters and home-employees (workers who live and work in MV) to get a deeper insight into this interesting phenomenon. We especially address the question whether out-commuters are a selective group of individuals working in occupations that are not needed for labour market requirements in MV. Additionally, we focus on the wage differential between out-commuters and `home employees` to work out potential strategies to attract out-commuters to work within MV. The derived evidence suggests that only a few out-commuters can be recalled, as labour demand in MV and the respective wage level are too low and the economic structure is too weak to sufficiently gain back out-commuters from a MV-perspective. Especially females suffer from the job-market weakness in MV.

Keywords

long-distance commuting, rural region, economic conditions

JEL:

J 21 – Labour Force and Employment, Size, and Structure

R 23 – Regional Labour Markets

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1. Introduction

In the 1990th regions in the eastern parts of Germany of the former GDR were characterized by an outflow of mainly younger workers caused by worse economic conditions such as high unemployment, low wages and less growth perspectives compared to the western parts of the former Federal Republic of Germany (Kröll and Niebuhr, 2014; Fuchs-Schündeln and Schündeln, 2009). In the meanwhile, the economic conditions have improved and outmigration reached 'normal' levels meaning that the net migration is rather balanced (Nadler and Wesling, 2003). However, outmigration in previous decades has left its mark: the age structure is characterised by a higher proportion of elderly people, resulting in a shortage of young workers (Schwengler and Hirschenauer, 2015). This together with the fact that in the next decades a large number of workers will retire in eastern Germany is leading to potential labour shortages: not all vacancies can be filled because there are not enough workers (Bach, 2008; Bundesamt für Bauwesen und Raumordnung, 2006). Burkard (2010) has already claimed, that a shortage of skilled workers is already apparent. This gives rise to an important debate for regional policy – policy makers have to ensure that future needs are satisfied: they try to keep all their resources in their regions. Out-commuters – workers who commute to work in another region – belong to this group and are the key focus of this study.

The federal state Mecklenburg-Vorpommern (MV) is one of these regions and politicians and labour market related actors claim labour shortages which is why they are trying to "win back" out-commuters. MV is located in the north of East Germany. The north border of MV is a natural one, the Baltic Sea. Moreover, MV shares a western border with Schleswig-Holstein (West Germany). Closed to the western parts of MV is the metropolitan area of Hamburg. To the East there is a common border with Poland and to the South it shares a common border with Brandenburg (East Germany). The northern regions of Brandenburg and MV itself has a high proportion of peripheral regions with low population density. In the West of MV there is the capital city Schwerin, with almost 100,000 inhabitants, surrounded by rather peripheral regions. Rostock as a harbour city is the largest city with about 245,000 inhabitants. Stralsund, Greifswald, Neubrandenburg and Wismar are other cities with about 30-70,000 inhabitants and are spread all over the federal state. In total, about 1.6 Mio people live currently in MV and the population density is less than 70 people per square km including the cities (about 35 excluding cities).

On 15.09.2017, about 535.000 people live and work subject to social security contributions in MV ('home employees'). Moreover, about 8.000 people (1.3%) live in MV but work outside MV with relatively low commuting distance up to 34km[3]. However, there are 76.000 employees living in MV but

[3] Approximately 75% of all out-commuters, travel distance up to 34km. Therefore, we assume that travel distances up to 34km are acceptable. Moreover, this definition is comparable to Sandow and Westin (2010)

out-commute with longer distances, i.e. more than 34km. The majority works in Hamburg, Schleswig-Holstein and Niedersachsen, which all belong to West Germany. Only about 20% of these long-distance out-commuters work either in Berlin or in Brandenburg. In contrast, MV counts only 25.000 in-commuters – workers who live outside MV but travel to MV for job related reasons. Thus, there is approximately one in-commuter relative to four out-commuters, indicating that MV is relatively weak in attracting individuals from other federal states. Because the short-distance commuters are labour resources that are potentially easily to win for a work in MV if closer, interesting job vacancies are available, they are not the target group of this study. Instead, we consider the group of long-distance out-commuters – workers who live in MV but work outside and travel more than 34km.

The aim of this study is to investigate what factors – individual, job-related and establishment characteristics – distinguish this group of long-distance out-commuters from the group of workers who live and work within MV. In addition, we are interested in the determinants of the wage differences between these two groups again considering individual, job-related and frim characteristics.

Our study contributes to the literature in at least three ways. First, it contributes to the literature on inter-regional commuting by investigating what individual and firm characteristics cause individuals to live in one region and work in another region (Castelli and Parenti 2020; Parenti and Tealdi 2019; Sandow and Westin 2010). Since wages are a key factor we pay particular attention on the wage differential between the group of out-commuters and home employees (Bergantino and Madio 2018). Investigating the factors that are important in explaining wage differences between these two groups can provide new insights and a deeper understanding of the labour market in MV in terms of occupational and individual characteristics that could be influenced by policy measures to gain back the group of long-distance out-commuters. And can thus show what regions with worse labour market conditions might be able to do to attract back the skilled workers who live in their region but work outside. Second, we make use of a vast data basis provided by the Institute for Employment Research, the Integrated Employment Biographies, IEB. This data basis covers all individuals working subject to social security contributions and represents a comprehensive source of not only individual but also of firm information. Third due to the distinction between men and women we can reveal differences in individual and firm-specific characteristics between men and women which are responsible for workers commuting out and regarding the wage gap.

In fact, we find different reasons for out-commuting for women and men. While men commute out for higher wages and better career opportunities women commute out to avoid unemployment.

who define a long-distance commuter as having travel distance from home to work of more than 30 km in Sweden.

Accordingly, MV has not only weak labour market conditions, but especially for women there is not even a demand for labour and thus it is rather difficult attracting back the group of out-commuters.

The remaining paper is structured as follows. Section 2 provides preliminary considerations and contributions. Section 3 discusses the empirical design and describes the data we use. The descriptive analysis is shown in section 4, while section 5 reports the results of the probit model and the Oaxaca-Blinder decomposition. Finally, section 6 concludes.

2. Preliminary considerations

Commuting between different labour market regions might be the result of strategic choices that balance housing and living costs, family, wage differentials and employment opportunities. This could be especially important for workers traveling between regions that differ in labour market conditions, like West and East Germany.

Although the economic situation in eastern Germany has improved since reunification, there are still high differences compared to West Germany (Blien et al. 2016). In particular, regarding the two key variables of the labour market: wages and unemployment[4] the differences to West Germany are still visible (Brenke 2014). Thus, people living in East Germany are consequently disadvantaged in many respects: (i) they have to accept lower wages, (ii) working conditions are not comparable (work council, career), and (iii) they face higher unemployment resulting in fewer job opportunities (Blien et al. 2010). Thus, these factors push workers to cross regional borders to escape underemployment (van Ham et al, 2001) and the low wage level (Reggiani et al. 2011). This is be confirmed for example by Bergantina and Madio (2018) for the UK. They find that regional wage differentials are important in explaining the inter-regional commuting behaviour, especially for men.

In regions with higher wage levels, however, housing prices are prohibitive, which in turn makes it attractive to live in other regions (with lower wages) but commute there to work. Housing prices, especially in rural regions such as in MV are significantly lower than in the neighbouring larger cities in western Germany such as Hamburg. This can make commuting a more attractive way than migration into these regions (Muellbauer and Cameron, 1998). Renkow and Hower (2000) also show that longer commutes are traded for lower housing prices in rural areas, which increases long-distance commuting between these two kinds of regions (Anderson 2018; Zax 1991). In particular, the number of those commuting more than 100km from rural to urban areas rises (Anderson, 2018).

[4] Although the unemployment rate has fallen significantly in East Germany in recent years, it is still higher than in West Germany (Granato et al. 2009). Moreover, the decline is in particular due to the falling number of workers in the east – more and more workers in East Germany are retiring.

Many studies have investigated which individual factors are important in explaining such high commuting distances. One of them is the age: older individuals travel less than younger workers. As older workers have not only longer working experience and stronger workplace attachment (Booth et al. 1999) but also seek less career advancements (Dargay and Clark 2012) leading them to a less willingness to commute.

Another common finding is that commuting increase with the education level: more educated workers are more mobile. They have to search longer for jobs because their job market is concentrated to a limited number of locations (especially to larger centres) and are thus not evenly distributed across space (Börsch-Supan 1990; Simpson 1992; Sandow 2008). Moreover, higher educated workers earn more money which makes it more profitable for them to commute longer distances (Groot et al. 2012; Dargay and Clark 2012). High earner households also have preferences for more living space, so they choose to live in the suburbs where housing prices and rents are cheaper, but with longer commuting ways (Brueckner 2000).

Examining the relationship between wages and commuting empirical evidence shows a compensation for the disutility of commuting (Laird 2006): Mulalic et al. (2014) find that workers are compensated for commuting by higher wages. Moreover, van Ommeren et al. (2000) and van Ommeren (2005) find for the Netherland individuals' marginal willingness to pay for an additional kilometer of commuting of 0.15 Euro per day (van Ommeren and Fosgerau 2009). This indicates that individuals want to be compensated for the disutility of commuting.

Considering gender differences, the literature found that men commute more than women (Hanson and Hanson 1993; Camstra 1996). Women earn less than men (MacDonald 1999) what makes commuting long distances less attractive. It is also easier for women to find jobs nearby, as they are more likely to work in the public sector which is geographically more evenly distributed (Halfacree 1995; Hanson and Pratt 1995). Women's commuting patterns are also constrained by household and family involvements (Gimenez-Nadal and Molina 2016).

In addition, commuting is found to increase for full time workers (McQuaid and Chen 2012): parttime workers are mostly women who commute less than men and parttime works are usually lower paid what makes commuting less attractive. Moreover, longer job tenure which is related to firm and sector specific human capital increases commuting because these workers are less likely to change jobs.

Therefore, there is evidence that long distance commuting is increasing, particularly between rural and urban regions and that, this effect might be due to a lack of job opportunities, like lower wages and cheaper housing prices in rural areas.

With MV being a rather rural region in Germany with poor labour market conditions, this region offers a good object of study. Since we are not only examining which characteristics affect individuals to out-commute, but also investigate the wage gap, we can gain insights beyond the existing literature. This allows us to determine exactly which individual and firm-specific factors are responsible for the wage difference and where policy measures should be applied.

3. Empirical Design & Data

3.1 Data

We make use of individual data on the basis of the Integrated Employment Biographies (IEB, version V13.01.01-190111) provided by the Institute for Employment Research (IAB) of the Federal Employment Agency in Germany. This data basis results from administrative data of the German Social Security System and is therefore highly reliable. It covers approximately 92% of the German entire labour market and includes vast information on individual employment and unemployment periods, individual and job-related characteristics, among others. It can be aggregated to any higher level of aggregation, such as firm, industry or region because of unique identifiers. Due to the consideration of only employed individuals working subject to social security contributions, self-employed and civil servants are excluded. With respect to content, this is not a limitation for our study because we aim to identify individuals who work subject social security contributions to gain back for work in MV.

The IEB covers the entire individual employment and unemployment biography. We draw a 100% sample of all individuals who live in MV at the reference day at the 15.09.2017. Although the analysis builds on a cross-section of individuals, we make use of the individual labour market biographies to construct measures of the individual performance in the past. These measures control for unobserved heterogeneity and ability in part. We further derive information for instance on job-changing behaviour to measure individual performance and activity at the labour market. Table 1 presents the variables, we consider in the analysis. They include individual and job-related characteristics. According to the results of Dostie et al. (2020) and Brunow and Jost (2020), firm characteristics are important to determine wage differences while considering the migrant-native wage inequality. Because these studies explicitly show that individual wages are affected by differences in firm characteristics, we take such measures describing the firm into account.

Table 1: Individual, Job and Firm characteristics

Characteristics

Occupations	Indicators for 36 distinct occupations (based on the classification of occupations 2010 KldB2010, equiv. to ISCO-08; excluding military services)
Tasks	Indicators for: Helper – Clerk – Specialists/ Experts
Leading responsibility	Indicators for: Supervision responsibility/ Leading responsibility
Vocational training	Indicators for: No/missing information – no vocational training – vocational training – University degree
Additional training	Indicator for working as foreman (German Meister/Polier)
Firm characteristics	Firm size (indicators for number of employees); proportions of human capital, females, foreigners and young employees; Indicators for industry (NACE, 2-digit)
Individual characteristics	Age (indicators for 4 age groups), indicator for being foreigner
Fulltime-Parttime	Indicators for fulltime, parttime or marginal employment
Labour market experience	Proportion of time spent in unemployment, duration at the current employer, average employment duration at different employers
Regional heterogeneity	5 labour market region indicators measured at the place of residence

The data covers information of the place of work and residence. We identify out-commuters and assign individuals as out-commuters, when the workplace is outside MV. To identify long-distance out-commuters, we first compute travel distance (by car) for all individuals who work and live in MV. We calculate travel distances by taking the distance between the central business district (CBD) of the workplace and the residence place (Meekes and Hassink, 2019) based on the algorithm by Huber and Rust (2016). In approximately 75% of all cases, travel distance was up to 34km. We therefore assume that travel distances within MV of up to 34km are acceptable and that each out-commuter with travel distances up to 34km would accept a job offer within MV immediately[5]. This group are short-distance

[5] This definition is comparable to Sandow and Westin (2010) who define a long-distance commuter who has a travel distance from home to work over 30 km in Sweden.

out-commuters and not the focus group. Therefore, we exclude these about 8,000 cases, representing 11% of all out-commuters, from the analysis.

We perform two proven data corrections: the first one relates to the correction of the education-related variable following the procedure suggested by Fitzenberger et al. (2005). For the second one we follow the suggestion of Card at al. (2013) and use an imputation method that overcomes the truncation of wages top-coded at the social security contribution ceiling,

After data preparation and the exclusion of short-distance out-commuters, the data set comprises 535,186 individuals living and working in MV and another 67,027 long-distance out-commuters.

3.2 Empirical Design

We use a probit model to identify individual characteristic as recorded in Table 1, which increase the probability to be an out-commuter. The estimates allow identifying significant group differences. Especially in the light of the "win-back-campaign", the identification of group differences is of especial importance. Are the groups distinct, the estimates would provide evidence of a (qualification-related) mismatch. If the groups were not "too" distinct, a win-back-campaign would be more successful if working conditions are attractive. Especially the wage differential is of importance: if payments within MV are not competitive, a win-back-campaign is potentially less successful. Additionally, as theory and empirical evidence show, wages are a main factor for long commuting distances (van Ommeren and Fosgerau, 2009; Brueckner, 2000; Manning, 2003; Green et al., 2019). In particular, we determine individual and firm-specific characteristics, which are the main driver for the wage gap. Significant characteristics are particularly important from a policy perspective to become competitive in wages within MV. For this examination, we use the threefold Oaxaca-Blinder decomposition (OB-decomposition) according to Jones and Kelley (1984). The estimation relies on the Mincer earnings function as a theoretical workhorse for the wage setting on the labour market. To perform the OB-decomposition, for both groups – the out-commuters and home-employees – a separate wage equation is estimated by OLS. The OB-decomposition divides the wage differential into an explained part consisting of differences in endowments, an unexplained part consisting of differences in coefficients and an interaction term. The endowment effect states: *How much more/less would a home employee would earn if we adjust the average endowment (i.e. the average x-values) to the level of the out-commuter*. Differences in endowments therefore indicate an unequal distribution of characteristics and would thus indicate worse labour market conditions for out-commuters at home, i.e. a kind of mismatch. The coefficient effect indicates differences in the slopes of the estimated Mincerian wage equations. Then, the interpretation of the coefficient effect is as follows: *How would an average home employee earn more/less if we adjust the coefficient to the level of the out-commuters*. We relate these different returns to characteristics as structural differences in payments

schemes. Employers in MV might become more competitive, when returns to characteristics are treaded in a way as for out-commuters. Lastly, the interaction effect considers the simultaneous adjustment of differences in endowments and coefficients.

Concerning the interpretation, we adjust the wage levels of home-employees to the level of out-commuters. This is a matter of choice and does not bias results in any respect. From a policy perspective, it provides insights on potential, required wage increases to become competitive with other regions; at least with payment levels of out-commuters.

4. Descriptive Analysis

The descriptions in Table 2 show that the share of out-commuters accounts for 11.1% in the sample of all home-employees and long-distance out-commuters. There is quite a heterogeneous structure with respect to age and gender: the proportion of out-commuters is higher for males compared to females. Considering the age structure of home-employees and out-commuters Table 2 shows slightly higher proportions of older workers among male out commuters. In contrast, female out-commuters are slightly younger, but these differences are not substantive. However, Table 2 reveals substantial differences between gross daily wages of male home and out-commuters: earnings are about 25 Euro higher, leading to approximately 750 Euro monthly surplus. For females, wages of out-commuters are higher, but with about 10 Euro (300 Euro monthly) more, less lucrative for out-commuting. Thus, out-commuting might be especially profitable for males. This confirms Sandow and Westin (2010) who consider long distance commuters in Sweden. They find that male commuters benefit more in terms of economic outcome, like wages.

Table 2: Age distribution and wages

	Male		Female	
	home employees	out-commuters	home employees	out-commuters
Age structure (share %)				
<25 years	9.1%	5.3%	7.2%	10.4%
25-34 years	21.8%	19.4%	18.5%	23.2%
35-44 years	20.8%	21.2%	19.6%	20.5%
45-54 years	24.7%	28.5%	28.0%	24.1%
>=55 years	23.7%	25.5%	26.7%	21.8%
Median wage (€/day)				
<25 years	29.05	37.66	30.36	28.16
25-34 years	68.45	85.94	60.06	71.64
35-44 years	75.14	100.86	62.51	75.78
45-54 years	77.53	106.96	66.82	75.82

>=55 years	73.78	100.26	64.11	68.41
No. of indiv.	258,405	47,246	276,781	19,781
Share (%)	84.5%	15.5%	93.3%	6.7%

Source: IEB version V13.01.01-190111, own calculation.

Moreover, out-commuting might be a result of a mismatch at the labour market. Table 3 therefore shows the distribution according to tasks: unskilled labour, skilled labour and specialist/experts. Indeed, there are relative more specialists and experts among male and female out-commuters. Surprisingly, Table 3 shows a relative higher proportion of out-commuting females who work in jobs as unskilled labour and earn less compared to home-employees.

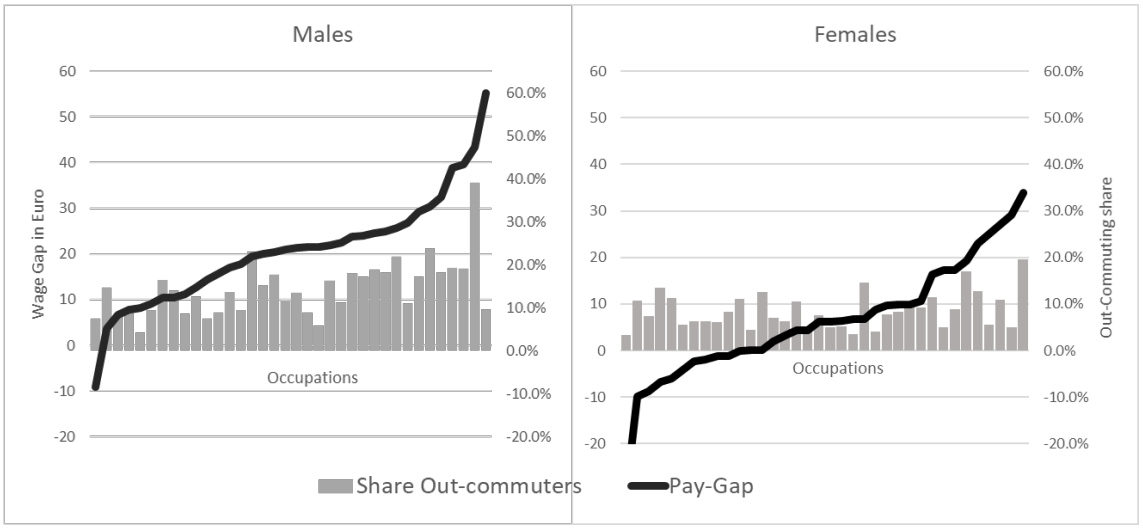
Table 3: Distribution of task levels and wages

	Male		Female	
	home employees	out-commuters	home employees	out-commuters
Task levels (share %)				
unskilled labour	14.4%	12.0%	16.4%	20.8%
skilled labour	65.5%	59.9%	62.9%	54.3%
specialists/experts	20.0%	28.1%	20.6%	24.9%
Median wage (€/day)				
unskilled labour	54.85	59.91	43.66	40.25
skilled labour	68.88	89.26	60.27	68.04
specialists/experts	116.01	151.65	101.41	113.4

Source: IEB version V13.01.01-190111, own calculation.

Figure 1 shows the wage gap between both group's home-employees and out-commuters (black line) and the proportion of employees within each occupation who out-commute (grey bars), separated by 36 occupations (labels not shown at the x-axis). To give an example: for males, the out-commuting share of more than 60% is in mining occupations. The median wage gap on gross daily wages is approximately 20€, which gives a difference in gross income of about 600€ per month. It is worth mentioning, that for about 1/3 of all females, the median gross daily wage differential is negative for the out-commuters. Thus, these females have to out-commute and receive less wages compared to female home-employees in the same occupation. They have to pay twice: first, lower wages and second, more time and travel costs that they spend for mobility.

Figure 1: Median gross daily wage differentials between out-commuters and home-employees



Source: IEB version V13.01.01-190111, own calculation.

5. Results

5.1 Who is an out-commuter?

We first present the estimation of a probit model on the differences between out-commuters and home-employees. With respect to the firm characteristics, we have to exclude the variables for the proportion of foreigners and the proportion of younger workers (see Table 1). This is necessary because of substantive differences in both variables between both groups. Both variables are otherwise perfect predictors for being an out-commuter. Because MV experienced large outflows in the 1990th and little immigration from abroad, the current workforce consists of relative higher proportions of elderly German workers (Kroll and Niebuhr, 2014; Bundesamt für Bauwesen und Raumordnung, 2006). In the western parts, on the other hand, immigration has a long-standing history since 1960th (Brunow and Jost, 2020) and on average a younger workforce (Schmidt and Zimmermann, 1992), leading to both shares as perfect predictors for out-commuters.

Table 4 reports the results of the probit model separated by gender. Columns 1 and 3 consider all males and females, respectively and columns 2 and 4 restrict to Germans only. In each estimation, all coefficients are jointly significant and pseudo R^2 is about 0.14. Because we are not interested in the magnitude to become an out-commuter but in the differences in characteristics between both groups, we only interpret the signs of the estimates.

Table 4: Results of the probit model: who is an out-commuter?

	Male		Female	
	Full Sample	No foreigners	Full Sample	No foreigners
	(1)	(2)	(3)	(4)
age 16-24	-0.579***	-0.659***	-0.271***	-0.322***
	(0.016)	(0.019)	(0.020)	(0.022)
age 25-34	-0.145***	-0.160***	-0.050***	-0.058***
	(0.009)	(0.010)	(0.012)	(0.013)
age 45-54	0.131***	0.136***	0.038***	0.044***
	(0.009)	(0.009)	(0.012)	(0.012)
age 55-64	0.159***	0.164***	0.072***	0.078***
	(0.009)	(0.010)	(0.013)	(0.013)
Foreigner	0.260***		0.262***	
	(0.017)		(0.022)	
Parttime	-0.034***	-0.055***	-0.033***	-0.041***
	(0.012)	(0.013)	(0.009)	(0.009)
Marginal Employment	0.016	0.007	0.180***	0.176***
	(0.017)	(0.018)	(0.016)	(0.017)
Unskilled labour with vocational training	-0.107***	-0.103***	0.080***	0.082***
	(0.012)	(0.013)	(0.014)	(0.014)
… # unknown voc. Training	0.286***	0.354***	-0.003	-0.018
	(0.028)	(0.046)	(0.032)	(0.044)
… # no voc. Training	0.249***	0.230***	0.125***	0.124***
	(0.022)	(0.025)	(0.024)	(0.026)
… # University degree	0.176***	0.179**	0.149**	0.114*
	(0.063)	(0.077)	(0.060)	(0.069)
Skilled labour with vocational training	reference	reference	reference	reference
… # unknown voc. Training	0.043*	0.150***	0.025	0.103***
	(0.022)	(0.030)	(0.030)	(0.037)
… # no voc. Training	-0.009	0.001	0.028	0.033
	(0.015)	(0.016)	(0.019)	(0.021)
… # University degree	0.145***	0.140***	0.094***	0.082***
	(0.022)	(0.023)	(0.021)	(0.022)
Specialist/Expert with vocational training	0.149***	0.138***	0.173***	0.167***
	(0.013)	(0.013)	(0.016)	(0.015)
… # unknown voc. Training	0.037	0.139**	-0.222***	-0.288***
	(0.051)	(0.062)	(0.081)	(0.102)
… # no voc. Training	0.054*	0.069**	0.156***	0.154***
	(0.032)	(0.035)	(0.041)	(0.043)
… # University degree	-0.138***	-0.145***	-0.061***	-0.070***
	(0.014)	(0.014)	(0.018)	(0.018)
Leadership responsibility	-0.031*	-0.031*	-0.045	-0.037
	(0.019)	(0.019)	(0.028)	(0.028)
Supervision responsibility	0.140***	0.141***	0.034	0.035

	(0.020)	(0.020)	(0.034)	(0.034)
Proportion unemployed <5%	reference	reference	reference	reference
Dummy unemployed 5% - <10%	-0.067***	-0.080***	-0.075***	-0.091***
	(0.010)	(0.010)	(0.013)	(0.013)
Dummy unemployed 10% - <25%	-0.178***	-0.195***	-0.171***	-0.193***
	(0.009)	(0.010)	(0.012)	(0.013)
Dummy unemployed 25% and more	-0.433***	-0.460***	-0.321***	-0.356***
	(0.012)	(0.013)	(0.014)	(0.015)
log(duration current firm)	-0.055***	-0.058***	-0.086***	-0.088***
	(0.003)	(0.003)	(0.004)	(0.005)
log(average duration in firms)	-0.227***	-0.242***	-0.203***	-0.218***
	(0.006)	(0.006)	(0.007)	(0.008)
Firm size <10 employees	reference	reference	reference	reference
Firm size 10-49 employees	0.256***	0.271***	0.143***	0.158***
	(0.009)	(0.010)	(0.012)	(0.012)
Firm size 50-249 employees	0.580***	0.609***	0.452***	0.474***
	(0.010)	(0.011)	(0.012)	(0.013)
Firm size 250+ employees	0.921***	0.946***	0.819***	0.836***
	(0.011)	(0.012)	(0.014)	(0.015)
proportion females in firm	-0.880***	-0.871***	-0.263***	-0.248***
	(0.019)	(0.021)	(0.021)	(0.022)
proportion high-skilled in firm	0.729***	0.750***	0.192***	0.199***
	(0.017)	(0.018)	(0.020)	(0.022)
Constant	-1.464***	-1.369***	-1.328***	-1.218***
	(0.040)	(0.042)	(0.066)	(0.069)
Residence region FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Occupation FE	Yes	Yes	Yes	Yes
N	305651	293012	296562	289465
pseudo R2	0.150	0.150	0.143	0.140

Note: Robust Standard errors in (). Level of significance: * 1%, ** 5%, ***10%. Source: IEB version V13.01.01-190111, own calculation.

Table 4 shows that younger workers are less likely to be out-commuters. Because the economic conditions have improved in the last years and there is also the fear of labour shortages, the necessity for young individuals to leave MV is reduced (Nadler and Wesling, 2003). In this light, out-commuting becomes less likely for younger individuals. In addition, foreigners are more prone to out-commute. This might be a result of the general low shares of foreign employees in MV and potentially a result of a less favoured region for a foreigner. Potential negative aspects, such as language barriers (Wang et al., 2018) and lack of German-specific knowledge, may lead to lower employment rates of foreigners, especially when (unemployed) Germans are available. Together with a relative lower labour demand and relative high supply, foreigners may lead to higher costs because of the mentioned negative

consequences and, as a result, decide to out-commute to avoid a potential long-lasting unemployment period. Moreover, Table 4 shows that out-commuters are more frequently in fulltime employment relative to parttime work. Interestingly, for female's marginal employment is more frequently found for out-commuters. A more detailed look into the data reveals that this is potentially driven by student and elderly workers: 27% of those individuals in marginal employment are of age 18-25, about the half of it holds an Abitur-School certificate and typical work in student jobs (i.e. working in bars, restaurants, office helper). Thus, these are most likely students who are still registered at home (in MV) but study elsewhere. Another 34% of that group in marginal employment are of age 54 and older hold a vocational training certificate and work in cleaning related jobs. This group will retire within the next decades and unobserved specificities might drive this long-distance commuting.

Considering the task levels reports very interesting results. Working as skilled labour holding a vocational training certificate is the reference group. Among the groups of unskilled and skilled employees, the proportion of individuals holding a university certificate and out-commute is higher. In contrast, working as a Specialist/ Expert and holding a university makes it significantly less likely to be an out-commuter for men, for women the coefficient is insignificant. Put differently, among the out-commuters, the proportion of university-degree-holders among specialists and experts is lower, indicating that skilled labour holding a VET degree occupy specialist/expert jobs. We see this result as evidence that in MV the demand for high-skilled labour is weak. There is a higher supply of university-degree holders in MV, forcing a part of them to out-commute to avoid unemployment. Out-commuters in specialist and expert positions are more often skilled labour, leading to the conclusion that within MV not enough upward-mobility options are available. Thus, the labour market in MV is too weak with respect to high-skilled jobs. This therefore indicates a lack of sufficient positions and job opportunities for more advanced jobs in MV and provides evidence that less jobs for specialists and experts are available in MV leading to a brain drain. In addition, the fraction of males taking a leadership position is higher for out-commuters. Again, there is a lack of leadership positions in MV, forcing especially males, who want to make carrier, to out-commute. For females, no effect emerges.

Considering measures of the employment biography, shows that out-commuters of both genders are typically less often unemployed and have a shorter period of employment duration within each firm. Thus, out-commuters change more frequently firms indicating other carrier paths. To put it differently, jobs in MV potentially do not allow for carrier steps and therefore, those who want to make their carrier (and, if they are male, overtake responsibility) have to out-commute.

As expected, out-commuters are more frequently employed in larger firms with a higher proportion of people holding a university degree. Again, obviously firms in MV do not provide a sufficient number of

jobs for better-qualified people and therefore, these people have to out-commute because of a qualification-related spatial mismatch.

Focussing on the occupation indicators reveals which occupations are typically occupations where people out-commute or are home-employees. For males, more frequently positive values occur, indicating a general higher likelihood to out-commute. For some occupations, the parameters are high, showing that such occupations are seldom demanded by firms in MV. Therefore, males have to out-commute to avoid unemployment. For females, the occupation-specific effects are less pronounced. Again, there are few occupations, in which females usually out-commute.

To conclude so far. We observe a certain brain drain of better skilled people out of MV and obviously a lack of more advanced jobs available in MV. Moreover, out-commuters are typically older; therefore, we expect a decline in out-commuting flows in future when these workers retire. In addition, employers in MV have to be aware that their younger workers keep their MV work places and do not start to commute in future. For this, better carrier paths' should be available in MV and potentially higher wages. This brings us to the second research question on the wage differential of out-commuters and home-employees.

5.2 On the monetary benefits of out-commuting

Tables 2 and 3 show large differences in wages between home-employees and out-commuters. From a policy perspective, it is important to understand, which characteristics explain the wage gap – are these individual characteristics, the occupational (mis)match or firm characteristics, among others? A first overview of the results of the decomposition are provided in Table 5. We report the estimates differentiated by gender, with columns 2 and 4 restricted to German employees only. Male out-commuters earn on average 36.9% more than home employees. However, for females the results show no significant difference. About 13.7% of the wage gap of males is explained by observed characteristics and 18.4% by differences in parameters. The interaction effect is present but relatively low, especially for males. With respect to the economic magnitude, a 1% wage increase accounts for approximately 0.78€ for males and 0.76€ for females in gross daily income (about 23.40€ per month).

Table 5: Evaluation of the Oaxaca-Blinder decomposition

	Male		Female	
	Full Sample	Germans only	Full Sample	Germans only
	(1)	(2)	(3)	(4)
Wage differential	36.9 %***	39.4% ***	1.4%	2.1%
	(0.012)	(0.015)	(0.071)	(0.076)
endowments	1.137***	1.155***	0.932	0.940
	(0.014)	(0.018)	(0.056)	(0.061)
coefficients	1.184***	1.178***	1.054***	1.053***
	(0.006)	(0.006)	(0.011)	(0.011)
interaction	1.017***	1.025***	1.032***	1.031***
	(0.004)	(0.004)	(0.013)	(0.012)
No. of individuals	305,651	293,012	296,562	289,465
Out-commuters	47,246	44,168	19,781	18,553
Home-employees	258,405	248,844	276,781	270,912

Note: Robust standard errors in (). Level of significance: * 1%, ** 5%, ***10%. Source: IEB version V13.01.01-190111, own calculation.

Table 6 reports the endowment effect in more detail. There is a negligible effect of the regional distribution of home employees and out-commuters, indicating that no higher wages of out-commuters can be achieved depending on their place of residence in MV. The effect of the difference in the occupational mix is very tiny. This aspect is important as it reveals that after controlling for other characteristics, the average differential is not caused by the unequal occupational mix. Adjusting the typical task structure of home employees to the level of out-commuters provides a wage increase of about 1.5% for males; we observe no effect for females. Thus, among the male out-commuters there must be a higher proportion of males in more qualified jobs. Therefore, less high-qualified jobs are available within MV, pushing better qualified workers to out-commuting. Finally, they earn on average higher wages. Little or no wage effects can be found when adjusting leadership responsibility, vocational training information and foreign status. Moreover, there is no significant effect of labour market experience related variables for males but a significant negative effect of almost 3.2% for females. Although out-commuting females are less frequent unemployed, show shorter firm tenure and are on average more frequently job-changes, they earn less. This indicates that especially for female's firm tenure is honoured in MV. Considering the individual age, shows that the age distribution is differently between both groups. Because out-commuters are slightly older, on average, higher wages are paid – according to the Mincerian wage equation – and thus, wages are higher of out-commuters. There is also a substance wage increase of about 4% for males caused by longer working time. As shown, the proportion of males in fulltime work is higher among out-commuters. With respect

to potential labour shortages in MV, an increase in hours worked of home-employees would not just increase the work volume but also wages. Lastly, differences in firm characteristics are associated with a wage increase of about 4.7% for males and 2.6% for females. Especially the employment size of firms in MV is smaller and firms employ less human capital. Therefore, potential gains of increasing returns to scale or benefits of human-capital-intensive production are missing, leading to lower wages. This aspect shows again the disadvantageous firm structure within MV.

Table 6: Results of the endowment effect

	Male		Female	
	Full Sample	No foreigners	Full Sample	No foreigners
	(1)	(2)	(3)	(4)
Regional distribution	1.003	1.004	1.005**	1.005**
	(0.002)	(0.002)	(0.002)	(0.002)
Occupations	1.001	1.002*	0.989***	0.989**
	(0.001)	(0.001)	(0.004)	(0.005)
TASK	1.015***	1.017***	1.001	1.003***
	(0.003)	(0.003)	(0.001)	(0.001)
Leadership responsibility	1.002***	1.002***	1.001**	1.001***
	(0.000)	(0.000)	(0.000)	(0.000)
Fulltime-Parttime-marginal employment	1.040***	1.042***	0.965	0.962
	(0.007)	(0.008)	(0.030)	(0.030)
Age	1.017***	1.019***	0.990*	0.991
	(0.003)	(0.003)	(0.006)	(0.007)
Foreigner	1.000		1.000	
	(0.000)		(0.001)	
Vocational information	1.008***	1.012***	0.989***	0.991***
	(0.003)	(0.002)	(0.001)	(0.002)
Labour market experience	0.996	1.000	0.968**	0.970**
	(0.006)	(0.006)	(0.014)	(0.014)
Firm characteristics	1.047***	1.049***	1.026***	1.028***
	(0.006)	(0.007)	(0.007)	(0.007)

Note: Robust standard errors in (). Level of significance: * 1%, ** 5%, ***10%. Source: IEB version V13.01.01-190111, own calculation.

The coefficient effect relates to differences in the evaluation of variables on the effect on wages. Here, potentially structural differences in the wage setting can be identified. The results of the coefficient effect are provided in *Table 7*. Most of the effects are insignificant or the values are relatively small,

i.e. negligible from an economic point of view. This indicates a fair wage setting and evaluation of productivity among MV employers and firms employing out-commuters outside MV.

However, there are noteworthy results for occupations, working time and leadership at the individual level but also for firm characteristics. Considering the occupations first: in the Mincerian wage equation, a separate indicator variable represents each occupation. The estimate is relative to a unique reference group and therefore, the entire list of indicators over all occupations relates to the wage dispersion. Because for both genders we see a positive, significant and economically important effect, we conclude that the wage dispersion is much higher outside MV. Therefore, wages differ between occupations within MV less compared to wages out of MV. In addition, the effect is more pronounced for females (about 4.4% higher wages). Put differently, females employed in MV would enjoy a wage increase of about 4.4% when their respective occupations are honoured, as it is usual outside MV. For males, the wage increase accounts for almost 2%. Moreover, leadership responsibility is honoured relatively stronger for out-commuters for both genders. Lastly, working time is much better valuated for out-commuters relative to employees in MV: for males, a wage raise for about 6.5% and for females for about 1.6%. As for occupations, the dispersion in wages between the employment types concerning the working time differs much, especially for males, between home-employees and out-commuters. From these results, we conclude the following hypotheses, left for future work: First, it might be that out-commuters have a good bargaining power and request higher wages for fulltime work to compensate potential commuting costs. Second, employers outside MV (mainly in West Germany) honour fulltime work relatively more, for instances justified by greater responsibility for a particular job. This lets hourly wages to rise.

An important result shows the coefficient for males for vocational information. The dispersion between coefficients is smaller for out-commuters relative to home-employees, leading to a wage decline of about 2.4% (3.5% excluding foreigners). High-skilled out-commuters earn more than skilled workers but the increase is less compared to home-employees. We have seen that high-skilled individuals out-commute and accept jobs which require vocational training degrees; they thus work over-educated. These workers finally devaluate their knowledge and accept job-offers that pay-out less in order to potentially avoid unemployment. Again, this indicates that especially better skilled individuals out-commute because of a weak labour market.

We identify differences in productivity-related characteristics of the firm. Would MV-male-employees get the returns from their respective employers regarding the firm characteristics, they would get 3.2% higher wages. Thus, returns to specific characteristics of the firm outside MV increase faster when we consider males. Therefore, male out-commuters tend to work in firms that are more productive. In spite of that, we provide evidence that the firm structure in MV does not benefit from internal scale

effects or human capital intensity as firms outside MV do. In addition, we see that out-commuting females work in less productive firms, leading to a wage decline of about 6.3%. This again indicates a pressure for females to work outside MV in less productive firms, to avoid a potential unemployment. Finally, the labour market in MV does not provide sufficient work places leading to an out-commuting of females. Finally, about 5.6% of the pay-gap for females and 6.1% for males is explained by unobserved characteristics in favour of out-commuting.

Table 7: Results of the Coefficient effect

	Male		Female	
	Full Sample	No foreigners	Full Sample	No foreigners
	(1)	(2)	(3)	(4)
Regional distribution	0.998	0.998	1.003	1.003
	(0.006)	(0.007)	(0.007)	(0.006)
Occupations	1.019***	1.020***	1.044***	1.045***
	(0.005)	(0.006)	(0.008)	(0.008)
TASK	1.006**	1.006**	0.999	1.001
	(0.003)	(0.003)	(0.003)	(0.002)
Leadership responsibility	1.016*	1.020**	1.016**	1.016
	(0.009)	(0.009)	(0.008)	(0.011)
Fulltime-Parttime-marginal employment	1.065***	1.069***	1.014**	1.014*
	(0.013)	(0.014)	(0.007)	(0.007)
Age	0.999	1.007**	1.004***	1.008**
	(0.001)	(0.003)	(0.001)	(0.003)
Foreigner	1.008		0.980***	
	(0.010)		(0.007)	
Vocational information	0.976*	0.965**	0.999	0.987
	(0.012)	(0.014)	(0.013)	(0.019)
Labour market experience	0.995	0.991**	1.005	1.004
	(0.005)	(0.003)	(0.012)	(0.008)
Firm characteristics	1.032**	1.036**	0.937***	0.936***
	(0.015)	(0.015)	(0.021)	(0.021)
Unobserved characteristics	1.061*	1.058**	1.056*	1.041
	(0.035)	(0.024)	(0.031)	(0.039)

Note: Robust standard errors in (). Level of significance: * 1%, ** 5%, ***10%, Source: IEB version V13.01.01-190111, own calculation.

The interaction effect captures the joint change in endowments and coefficients. The results are provided in Table 8. Although some effects are significant from a statistical point of view, they are rather small from an economic point of view. One exception are firm characteristics in favour of female out-commuters. While the coefficient effect reveals a disadvantage, the endowment effect shows a positive effect (evaluated at MV coefficients). Thus, there might be only small within-variation within firm characteristics of out-commuting females that lead to this result.

Table 8: Results of the Interaction Effect

	Male		Female	
	Full Sample	Germans only	Full Sample	Germans only
	(1)	(2)	(3)	(4)
Regional distribution	0.997**	0.996**	1.004*	1.004*
	(0.001)	(0.001)	(0.002)	(0.002)
Occupations	1.006***	1.006***	0.997	0.997
	(0.001)	(0.001)	(0.004)	(0.004)
TASK	1.001	1.001	1.001	1.001
	(0.001)	(0.001)	(0.001)	(0.001)
Leadership responsibility	1.000**	1.000**	1.000**	1.000
	(0.000)	(0.000)	(0.000)	(0.000)
Fulltime-Parttime- marginal employment	1.006***	1.008***	1.007**	1.008**
	(0.002)	(0.002)	(0.003)	(0.003)
Age	1.001*	1.005***	0.997***	0.996***
	(0.001)	(0.001)	(0.001)	(0.001)
Foreigner	1.000		1.002***	
	(0.001)		(0.001)	
Vocational information	0.998***	0.996***	1.004***	1.004**
	(0.001)	(0.001)	(0.001)	(0.002)
Labour market experience	1.000	1.002***	0.998	0.999
	(0.001)	(0.001)	(0.004)	(0.002)
Firm characteristics	1.008**	1.012***	1.022**	1.022**
	(0.004)	(0.005)	(0.010)	(0.011)

Note: Robust standard errors in (). Level of significance: * 1%, ** 5%, ***10%, Source: IEB version V13.01.01-190111, own calculation.

6 Conclusion

In the 1990th poor economic conditions and relative high levels of unemployment in East Germany were the main drivers for individuals to migrate to the western parts of Germany. At the same time, long-distance out-commuting occurred as a strategy to avoid long-lasting unemployment. Nowadays, migration flows are rather equalized and the net-migration rate is rather balanced. However, because of the outflow of especially younger workers in the 1990th, the age structure in East Germany shows relatively higher values of mature workers, who retire in the next years. This puts the labour market in East Germany under pressure and there is the fear of labour shortages. Therefore, policy makers but also employers want to gain back out-commuters. This is an interesting target group as they already live in East Germany. We focus on the Federal State Mecklenburg-Vorpommern (MV) and analyse the patterns of out-commuters. Our analysis provides evidence of reasons for out-commuting from MV. The results show that less job opportunities, less labour demand and lower wages are the key factors why people living in MV commute out. Especially out-commuting women are affected: although they have higher costs due to commuting, they do not earn more than females in MV indicating that they commute to escape unemployment. Moreover, a high proportion of out-commuters are of skilled labour indicating that job opportunities especially for better skilled workers are rather rare in MV. On top, such better-qualified workers more frequently work as qualified workers and not, as expected, as specialists or experts. Thus, such better skilled out-commuters tend to work overqualified outside MV, which indicates a brain drain (of the past). Considering the wage gap between out-commuters and home employees, we find that the wage gap accounts for about 37% in favour of out-commuting for males and almost zero for females (on average). For males, a higher share of fulltime working out-commuters, differences in the age distribution and especially firm characteristics explain the wage gap by about 14% (endowment effect). Moreover, in MV, firms are too small to gain from internal economies of scale and therefore, wages are relatively lower. However, there are significant differences in coefficients indicating that the wage setting behaviour outside MV honours fulltime work and leadership responsibility relatively more. We again find evidence of over-education and brain drain for high-skilled workers. They potentially out-commute to avoid long lasting unemployment caused by the weak labour market in MV. Again, the returns of firm characteristics are larger for out-commuters (coefficient effect), indicating that firms outside MV are relatively more productive, when they become larger. For females, the positive endowment effect of firm characteristics is lower and accounts less to the wage gap relative to males. We further provide evidence that obviously females out-commute for labour market reasons to avoid unemployment. Lastly, females work partly in less

productive firms outside MV, indicating again, that out-commuting must be a reaction to prevent unemployment.

For both genders, the wage spread is larger outside MV; i.e. the coefficients of the occupational indicators differ significantly; almost 2% for males and about 4.4% for females. Thus, firms within MV set wages more equally among occupations whereas the wage spread is larger outside MV.

This brings us to the conclusion: if employers and policy makers within MV want to gain back out-commuters such that they provide their work capacity within MV, structural changes at the labour market have to occur first. Especially job opportunities for high-skilled individuals are not enough, leading to braindrain. Females partly out-commute and accept lower wages to avoid unemployment. Employers have to rethink their wage setting behaviour in general to become competitive with the wage setting of firms outside MV. Lastly, the firm productivity is relatively lower within MV, indicating structural differences and lead at least to the relative lower labour demand for highly skilled individuals. Thus, to make MV more attractive for individuals, significant economic improvements have to be done.

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